PROJECT NUMBER: 2501
PROJECT TITLE: Smoke chemistry
PROJECT LEADER: R. Comes
PERIOD COVERED: June 1988
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I. SIDESTREAM SMOKE

A. Objective: Collect and analyze sidestream smoke from different cigarette models by GC/MS. Investigate detection of known odorants in sidestream smoke by GC. Develop standard parameters for sidestream smoke collection and analysis. Design and apply instrumentation for sidestream visibility measurements. Collect and analyze gas phase smoke from radiolabeled cigarettes.

B. Status: (1) A Tekmar desorber installed on a Vista 6000 GC for SS gas phase analysis is functional but problems with failed solenoids persist. (2) Limitations of GC as a method to detect odorants in smoke have been investigated. (3) Collection of SS and MS smoke data for the CORESTA sidestream cooperative study to establish standard parameters is in progress. (4) The 17-port smoker for SS visibility measurements is fully operational and operator training has been completed. Work is in progress to set up a 5-port smoker for SS visibility studies. (5) Method development to use gas radiochromatography to analyze smoke from radiolabeled cigarettes is in progress.

C. Results: (1) Solenoid problems associated with the Tekmar desorber are being investigated, with assistance from Tekmar service personnel. Despite these problems, a protocol has been developed to collect and analyze SS gas phase using a Tenax trap/desorber/GC system, with parallel FID, NPD and MSD. More than 150 compounds have been identified in gas phase smoke from 2R1 cigarettes using this approach. (2) A memo has been written summarizing results of smoke investigations with odorous valerate compounds using GC as a method of detection. (3) Collection of SS smoke from Spanish and FCV cigarettes for the CORESTA study were continued. Kentucky reference 1R4F, Marlboro, Capri, and Elan cigarettes were smoked to collect TPM for comparison to visibility measurements. (4) The 17-port smoker is being used for SS visibility measurements of various cigarettes. Parts for an optical system that will approximate sunlight have been ordered for use with a 5-port smoker that is currently being reassembled. (5) The minimum amount of radioactivity detectable using the GC radioactivity detector is 0.5 nCi. Work continues to establish the counting efficiency of the detector. Mainstream gas phase from a ^{14}C-glycerol cigarette has been analyzed and preliminary results show radiolabeled carbon monoxide, carbon dioxide, methane, ethane and ethylene to be present.

D. Plans: (1) Continue method development of gas phase analysis. Apply method to different cigarette models. (2) Build a sniffing port for use in the application of GC detection of odorant compounds in smoke. (3) Continue collection and analysis of data for CORESTA study and comparison to visibility measurements. (4) Continue development of

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instrumentation for SS visibility studies (5) Continue testing and method development of GC radioactivity detector for routine use.

II. SIDESTREAM SMOKE CHAMBER

A. Objective: Design and construct an environmentally controlled chamber to measure selected components of sidestream smoke.

B. Status: (1) Laboratory modifications to facilitate construction of the chamber are in progress. (2) Cost data of laboratory reconstruction, chamber construction and installation, and of proposed instrumentation has been acquired.

C. Results: A justification job order and appropriation request have been submitted.

III. MISCELLANEOUS

(1) Pyrolysis/GC/MS analyses have been carried out on various samples as requested. (2) The neutron camera, used in neutron radiography, was rewired for use with the new Gould image processor. An intensive training course on the use of the image processor was attended at UVa.

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